

Appl. No. 10/589,418  
Amendment Dated July 23, 2009  
Reply to Office Action of February 18, 2009

**•••REMARKS/ARGUMENTS•••**

The Official Action of February 18, 2009 has been thoroughly studied. Accordingly, the changes presented herein for the claims, considered together with following remarks are believed to be sufficient to place the application into condition for allowance.

By the present amendment, an inadvertent obvious typographical error to claim 1 has been corrected. Support for this change can be found in applicants' original claims.

Entry of the change to claim 1 is respectfully requested.

Claims 1-8 are pending in this application.

On page 3 of the Office Action the Examiner has rejected claims 1-8 under 35 U.S.C. §112, second paragraph as failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Under this rejection the Examiner has taken the position that the recitation "general formula" is unclear.

In response to this basis for rejecting the claims, the undersigned conducted a search on the phrase "general formula" in the "Claims" field on the U.S. Patent Website data base. As a result 37131 patents were identified as having the phrase "general formula" in the claims.

This indicates that the phrase "general formula" is well known and understood by those skilled in the art.

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A further search on the U.S. Patent Website data base indicates that the Examiner has issued a number of patents with the phrase "general formula" in the claims.

Based upon the above, it is unclear why the Examiner is rejecting applicants' claims because of the recitation of "general formula."

On page 4 of the Office Action the Examiner has rejected claims 1-8 under 35 U.S.C. §112, first paragraph as containing subject matter which was not described in the specification in such a way to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention.

Under this rejection the Examiner has taken the position that:

1. The recitation of "paraformaldehyde" in claim 1 is considered new matter; and
2. The process of new claim 5 is new matter, because there is no process in the specification which allows reaction with trioxane.

"Paraformaldehyde" is discussed in applicants' paragraph [0008] and Example 1 (paragraph [0014]).

The disclosure of a reaction with trioxane is discussed in applicants' paragraph [0008]

It is accordingly submitted that applicants' disclosure satisfies the requirements of 35 U.S.C. §112, first and second paragraphs.

Claims 1-4 and 6-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Weinmayr (JOC, 28, 492-4, 1963) JP 61-097277 to Yonosuke et al. ("Yonosuke '277") and JP 63-146868 to Yonosuke et al. ("Yonosuke '868").

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The Examiner has relied upon Weinmayr as teaching:

...a process for producing 2,2,3,3-tetrafluorooxethane by reacting fluoro-olefins with formaldehyde in hydrogen fluoride. Trifluoroethylene condenses with formaldehyde in liquid hydrogen fluoride to form 2,2,3,3-pentafluoro-1-propanol and fluoromethyl 1-2,2,3,3,-pentafluoropropyl ether. See the entire document especially abstract, 1-32, 1<sup>st</sup> column on page 493.

The Examiner has relied upon Yonosuke '277 as teaching 2,2,3,3-tetrafluorooxethane.

The Examiner has also relied upon Yonosuke '868 as teaching 2,2,3,3-tetrafluorooxethane.

The Examiner states that:

[Applicants'] Presently claimed invention is drawn to a process for producing 2,2,3,3-tetrafluorooxethane, which comprises allowing tetrafluoroethylene to react with a formaldehyde compound in anhydrous hydrogen fluoride reaction being is carried out in the presence of polyfluoroalkylic acid or polyfluoroalkyl ester thereof, represented by the formula:  $RfCOOR^f$ .

The Examiner states that:

Instant claims for process for producing 2,2,3,3-tetrafluorooxethane has been generically taught by the reference.

The Examiner takes the position that:

It would have been obvious....to prepare 2,2,3,3-tetrafluorooxethane, by formaldehyde or its derivative and anhydrous hydrogen fluoride because prior art teaches this method. JP references also teach 2,2,3,3-tetrafluorooxethane (since there is criticality of invention has been disclosed in the specification examiner considered that claims are obvious over the prior art. Final decision will be made after considering the translation of JP REFERENCES. The reaction to prepare 2,2,3,3-tetrafluorooxethane and its derivatives has been taught by the reference.

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Weinmayr teaches that the 2,2,3,3-tetrafluorooxethane is formed as a "minor by-product." In this regard, Weinmayr is concerned with forming 2,2,3,3,3-pentafluoro-1-propanol and fluoromethyl-2,2,3,3,3-pentafluoropropyl ether.

On page 492, right hand column, lines 19-25, Weinmayr discloses that "small quantities of 2,2,3,3 [where 2,2,3,3,3 must be a clerical error]-tetrafluorooxetane  $\text{CF}_2\text{CF}_2\text{CH}_2\text{O}$ , b.p.  $28^\circ\text{C}$  – are also formed."

Furthermore, on page 492, right hand column, lines 7-55, Weinmayr discloses that "Upon careful fractionation 300 g of 2,2,3,3-tetrafluorooxetane, b.p.  $28^\circ\text{C}$ , and....were obtained;" however, due to the indefinite disclosure such as "Nine condensations made as described above were combined..." it is not possible to calculate the percentage yield of the 2,2,3,3- tetrafluorooxetane obtained by Weinmayr.

The Examiner had previously cited Weinmayr at "1-32 1<sup>st</sup> column on page 493."

Applicants note that on page 493, left hand column, lines 1-32 that there is no disclosure of 2,2,3,3- tetrafluorooxetane.

On page 493, in the right hand column under "Reaction of Tetrafluoroethylene with Formaldehyde," Weinmayr discloses "6 moles of formaldehyde is made to react with 3 moles of tetrafluoroethylene [TFE] in the presence of 600 g of HF to synthesize 429 (2.5 moles) of 2,2,3,3,3-pentafluoro-1-propanol in yield of 8.7% in terms of TFE, wherein 61 g (0.34 moles) of fluoromethyl-2,2,3,3,3-pentafluoropropyl ether is obtained as a by-product in yield of 11.3% in terms of TFE; total yield being 96.0%."

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This means that the reaction is mainly directed to formation of 2,2,3,3,3-pentafluoro-1-propanol, where 2,2,3,3-tetrafluorooxetane, when formed as a by-product, has a yield of 4.0% at the most.

In applicants' specification there is presented a Comparative Example that shows a process as disclosed by in JOC by Weinmayr where the yield of 2,2,3,3-tetrafluorooxethane was 18.8%. (See page 6 of applicants' specification)

In contrast, according to the present invention which is based upon the reaction in the presence of polyfluoroalkyl carboxylic acid or a polyfluoroalkyl ester, the yield of 2,2,3,3-tetrafluorooxethane is 35.3 to 39.3%, which is almost double as shown in the results of applicants' Examples 1-4.

It is submitted that applicants' claimed process for producing 2,2,3,3-tetrafluorooxethane (as a product as opposed to a minor by-product in the case of Weinmayr) is not at all taught or suggested by Weinmayr.

Applicants' process produces yields of 2,2,3,3-tetrafluorooxethane that are significantly greater than Weinmayr.

Accordingly, it would not have been obvious...."to prepare 2,2,3,3-tetrafluorooxethane, by formaldehyde or its derivative and anhydrous hydrogen fluoride" as the Examiner concludes. Rather, it is submitted that applicants' results are unexpected over the teachings of Weinmayr.

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If anything, it would go against the teachings of Weinmayr to make or propose any modification that would increase the yield of by-products to the detriment of producing a greater desired product yield.

It is submitted that such an improper modification is tantamount to destroying or at least departing from the teachings of Weinmayr.

An English translation of each of Yonosuke '277 is being submitted herewith for the Examiner's review. Also submitted is EP 0 252 454 which corresponds to Yonosuke '868 (See applicants' International Search Report).

Yonosuke '277 and Yonosuke '868 neither teach nor suggest a reaction that is carried out in the presence of polyfluorocarboxylic acid or polyfluoroalkyl ester with tetrafluoroethylene being reacted with a compound that generates formaldehyde in anhydrous hydrogen fluoride to form 2,2,3,3-tetrafluorooxethane.

Therefore, the teachings of Yonosuke '277 and Yonosuke '868 are not actually relevant and do not cure the deficiencies of Weinmayr.

It is noted that Yonosuke '277 and Yonosuke '868 were cited as category A references in the applicants' International Search Report, because they were only considered as being of general interest.

Further in the Written Opinion of the International Searching Authority, the claims were held to be novel, involve an inventive step and have industrial applicability over Yonosuke '277 and Yonosuke '868.

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Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicants' claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

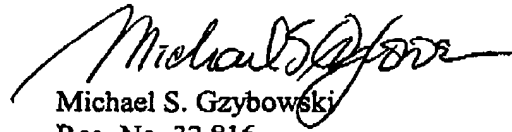
If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

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No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,



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